BPS RS125 CDi

Product Manual

For :
RS125 Special CDi
RS125 GP Max CDi

BPS RS125 CDi Contents

The BPS system provides Engine Management, Rider control and Pit stop data for the Honda RS125 race motorcycle.

Included in the BPS RS125 CDi System are:

- CDi control unit
- Dashboard unit
- Handlebar switch
- PC Programming lead
- PC Programming lead charger
- Software disks (5 off) or CD (1 off)
- Speed sensor and fittings
- Gear position sensor

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Key BPS RS125 CDi Features are:

- Plugs into the standard Honda loom - no complex wiring
- T○tal control of ignition maps by the user - including development tools to design new maps
- 4 Rider selectable mapsets (6 gear maps per mapset)
- Mapped up to 18,000 RPM ignition timing , spark voltage control
- Power jet control, Catch tank control
- Detonation counter and rider indicator, detonation analysis
- Gearing analysis
- Lap timer with fastest lap
- Ignition gear cut adjustable per map and gear
- Water pump controller adjustable per map
- Speed measurement, maximum speed recorded
- Change gear indicator, maximum RPM recorded (in 6th gear, over 50% throttle)
- Maximum temperature (4th / 5th / 6th gear) , maximum / minimum temperature warnings
- Low / high voltage warnings

- RS125 GP CDi Additional features

  - Throttle - off retard , selectable range and degrees of retard
  - Exhaust temperature logged
  - Cyclider pressure from detonation ring logged
  - Each gear individually mapped

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Motorcycle / Personal Computer Requirements:

- Suitable for Honda RS125 Motorcycle 1995 to 2000
- Standard loom, standard coil, standard pickup rotor and sensor
- Alternator or battery powered
- Left hand gearbox cover requires machining for the gear position sensor
- Windows 95 / 98 / NT Compatible, greater than 800*600 screen resolution, 256 colours, 3.5" disk
- 10M free drive space , 9 pin comm-port

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Fitting The BPS RS125 CDi unit

- Load the software onto a suitable PC. - See Installing the PC software
- Remove existing CDi unit, remove the grommets from the original CDi and insert into the BPS RS125 CDi, install the BPS unit using existing bolts and spacers
- Remove the tacometer from the existing foam dashboard
- Remove the three plastic plugs retaining the existing foam dashboard and install the BPS dashboard using existing plastic plugs
- Insert the tacometer into the BPS foam dashboard
- Connect the temperature sensor wiring - See Connections and wiring
- Connect the detonation sensor wiring if required - See Connections and wiring
- Machine the left hand gear box cover in order to fit the gearposition sensor, fit the sensor - See Selector drum and left hand transmission cover machining
- Fit the handlebar switch to the left-hand handlebar, move the kill switch to the right hand side - See Handlebar switch
- Check that the rotor pickup coil adjustment is set to zero degrees. (access via right hand gearbox cover)
- Enable the system to learn the gear positions and download these to the CDi. - See System Configuration
- Program in the maps required - See Starting the software program and Programming the CDi with mapsets

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Check Before using The BPS RS125 CDi system

- Plug the mains electric charger into the PC programming lead power inlet
- Plug the PC programming lead (black connector) into the communication lead, the dash unit illuminate
- **PLEASE NOTE** - Display action is slow when engine is not running
- Check that the gear positions displayed are correct
- Check the temperature reading is correct
- Check that the throttle position percentage when fully off is correctly displayed on Screen 2

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Connections and wiring on the BPS RS125 CDi unit

Powering the CDi

The CDi can operate on the standard alternator or on a battery source. The power consumption is directly affected by the spark voltage, the default spark voltage map will cause a similar power consumption to a standard Honda CDi.

See CDi Battery / Alternator Supply Notes

WARNING:
DO NOT CONNECT A BATTERY TO ANY CDI SENSOR POWER LEADS OR THE USER COMMUNICATION CONNECTOR

Connections:

see:

CDi to Dashboard Communication lead

4 core cable, black / blue / yellow / red, cable identifier = (1)

Connect between the CDi unit and dashboard unit.
If using the CDi without the dashboard unit the CDi can be programmed via this connector.

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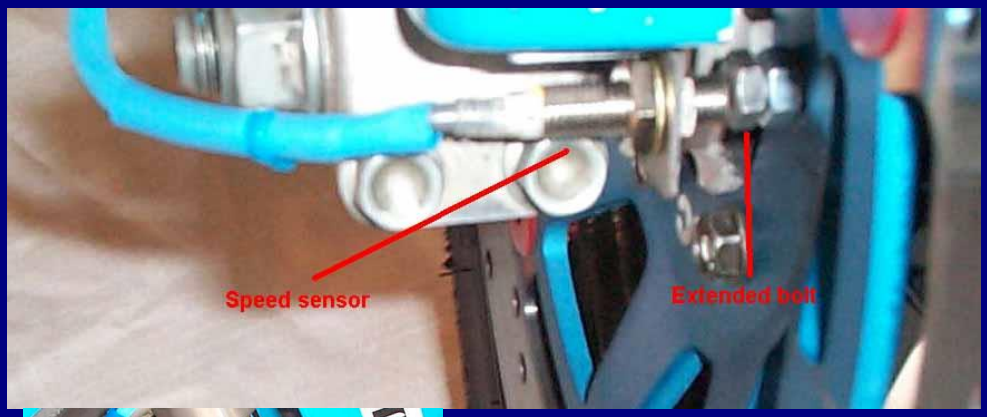
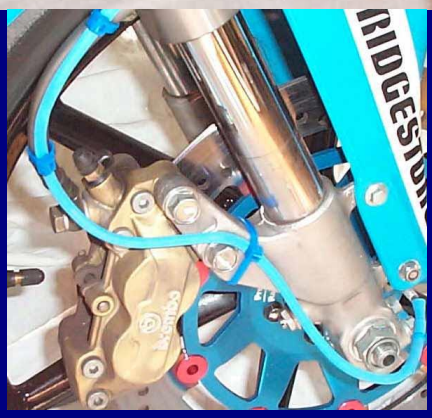
Speed Sensor:

3 core cable, blue / black / brown, identifier = (5)

The speed sensor detects a single extended bolt on the front (or rear) wheel. The single bolt is extended by using a single nut tightened against the rear of the bolt head. The speed sensor is fitted using the bracket supplied, use the 20mm M5 bolt inserted from wheel side through the bracket and through the threaded mudguard support, mudguard, and with a plain washer fix with the self locking nut. The sensor detecting face should be 0.5mm away from the detected bolt head. When the CDi control unit is powered the speed sensor yellow indicator will light when detecting metal.





If fitted to the front wheel the speed sensor cable should be routed from the sensor, large tie-wrap around the brake support block, up the brake hose with 4
tie-wraps and through the plastic splash screen to the CDi control unit.

Speed sensor Notes:

- If it is found that the speed value measured is low then ensure that the sensor is close enough to the detected bolt head
- If the value is too high then ensure that the head of the bolt is flat and not embossed, causing a double pulse.
- View a logged track session and ensure a smooth speed result - erratic speed log indicates a loose bracket or gap large.

The connections are:

  - brown = +12v

- black = signal, pulled to Gnd by the sensor on detection of metal
- blue = Gnd

For two front wheels the speed sensor is supplied with, for each wheel:

- 1 off M6 20mm bolt
- 1 off plain nut

For the fixing of the bracket the speed sensor is supplied with:

- 1 off M6 20mm bolt
- 1 off self lock nut
- 1 off plain washer
- 1 off bracket
- Speed sensor, 2 retaining nuts, shake proof washer

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Gear position sensor:

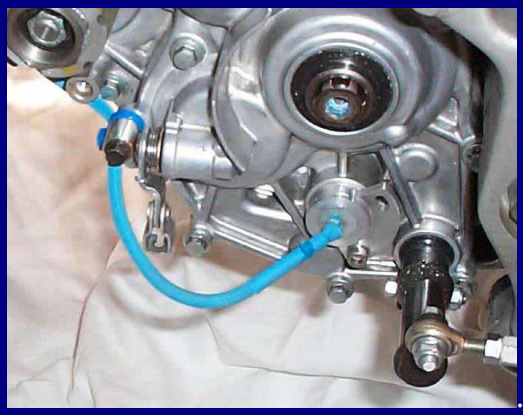
2 core cable, black / grey, identifier = (2)

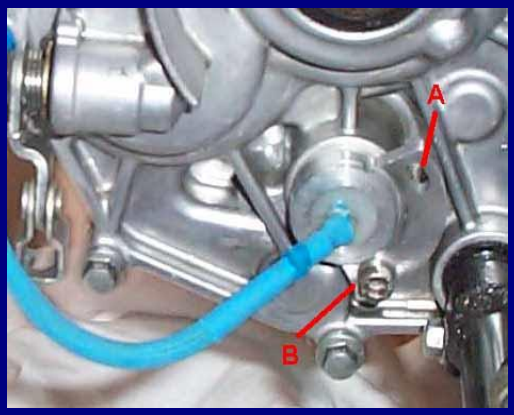
The gear position sensor is fitted into the machined left hand gearbox cover. The sensor detects the rotational position of the gear selector drum. The CDi control unit requires programming with the gear positions to enable a reliable and accurate gear change point.

Untouched gear selector drum / BPS position slot:
The left hand transmission cover and selector drum requires machining - see the machining details
Bolt the BPS gear position sensor in sensor mounting hole A

Previously Honda A / B-kit / TSR sensor:
The left hand gearbox cover requires machining and an oil seal inserting - see the machining details
If a selector drum has previously used a TSR sensor then this slot only requires widening and chamfering.
Bolt the BPS gear position sensor in sensor mounting hole B

The gear position cable is routed down the left hand side of the motorcycle. Starting from the sensor install 1 tie-wrap to the cover near the clutch, route the cable around underneath the alternator windings and tie-wrap to the chassis, following the rear of the chassis leg upwards tie-wrap to the cables going to the air box area





Gear position sensor notes:

- If it is found that the gears indicated are incorrect then use the PC to re-learn the gear positions
- When removing the transmission cover, leave the gear position sensor in place - carefully replace the cover guiding the pin into the slot
- PLEASE NOTE - When operating on a battery and the engine is not running the detection of gear change is slow

The connections are:

- black = Gnd
- grey = signal, resistance change between 100R and 10K can be detected

The gear position sensor is supplied with:

- M5 cap head bolt
- M5 washer
- O-ring Oil seal
- Gear position sensor and cable

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Temperature connector:

2 core cable, pink / pink, identifier =(3)

The CDi unit is supplied without a temperature sensor connector, cut the lead of the existing temperature sensor to a length of 200 mm from the connector. solder and sleeve (supplied) the connector wires onto the CDi wires (pink to pink)

- If the temperature reading is 0 DegC then check for open circuit, connector not pushed on to sensor correctly etc.
- If the temperature reading is 149 DegC then check for a short circuit.
- If the temperature reading is 255 DegC or any other incorrect value then the CDi unit requires the configuration reloading to reprogram the temperature sensor resistance.

The connections are:

- pink = signal
- pink = signal

Note:
Do not attempt to operate both the Honda temperature display and the BPS temperature connection together. The method of temperature detection is different

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Detonation Sensor Lead:

2 core cable, blue / yellow, cable identifier =(7)

The cable is supplied without a connector. If connection is required to a Honda detonation ring. Directly connect to the detonation ring then connect blue to green (earth) and yellow to red(signal).

Notes:

- The detonation counter will not detect unless the engine is running
- Always route the cable away from the high voltage spark plug lead
- To test, remove the detonation ring, attach to a separate head and plug, tighten to 25N/m and place a 16mm socket over the plug, run engine - tap socket with hammer
- Excessive detonations could indicate a stuck / trapped ring
- If left unconnected the detonation ring can detect ignition pulses - join the two inputs together to inhibit.

The connections are:

- yellow = signal
- blue = Gnd

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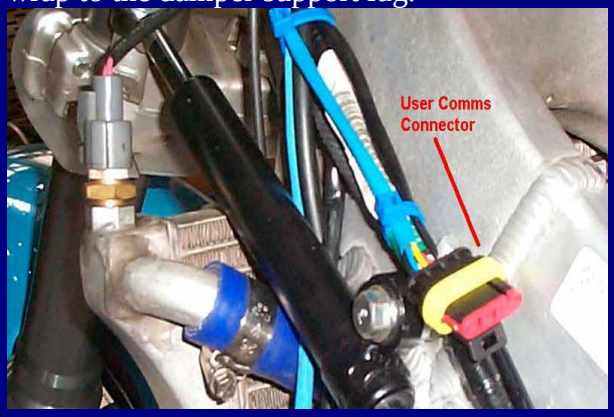
CDi User Communication lead:

4 core cable, black / blue / yellow / red, cable identifier = (0)

The communication lead is the longest lead from the dashboard unit. It allows connection to a PC for programming. Position the lead down the left hand side of the motorcycle and tie-

wrap to the damper support lug.



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Lap sensor:

3 core cable, black / purple / red, cable identifier = (4)

The input can be connected to a range of lap sensors. the connections are:

- black = Gnd
- purple = signal in (trigger if momentary to Gnd)
- red = +12v supply

A lap time of less than ten seconds will be ignored and the engine must be running.

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Catch tank Solenoid driver:

2 core cable, red / grey, cable identifier = (6)

The 2 wires can connect directly to a solenoid valve.
the connections are:

- grey = output line driven to Gnd on activation
- red = +12v supply

Software settings alter the throttle position percentage of activation and the activation state:

- normal = powered to close valve at low throttle.
- inverted = not powered to close valve at low throttle.

If testing the solenoid driver when engine is not running, then the response will be slow. To alter the position of the throttle point, power the CDi, read the displayed throttle percentage, adjust the software setting to this percentage.

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Ignition gear change cut :

1 core cable, white, cable identifier =(8)

The wire can connect to the BPS gear change sensor or to a switch or pressure sensor. The connections are:

- white = signal input 0-5V (normally pulled to 5V)

Software settings alter the number of ignition cycles cut, the direction of the input signal and threshold level 0-5V -> 0-100%.
The settings can be altered per gear and per map. The cut is disabled in 6th gear.

Mode:
Mode selects off / up / down, direction defines the input signal direction on a gear up movement change.
It is advisable in case of sensor failure to select one map (the safe map) to have the ignition cut mode set to off.

Revolutions cut:
On detection of a gear change the ignition is cut for the programmed revolutions, activation whilst cut will be ignored.
A typical number of revolutions to cut for are:

1st/2nd	12
3rd	11
4th	10
5th	8

Level:
With a switch sensor set the threshold level to 50%. With a pressure sensor set the level according to user feel.

Wiring of TSR SuperShifter to the CDi gear change cut input

- Remove the TSR control box - rejoin the coil drive wires
- Remove the 3 pin TSR sensor connector
- Leave the TSR sensor in position and route the 3-core cable to the CDi area
- Re-use the black 2-pin latching power connector from the RS125 temperature module (no longer used on the BPS CDi)
- Solder and sleeve the wires

  TSR Sensor Brown - power connector Black
  TSR Sensor Blue - power connector Green

- Plug the power connector into the original temperature power socket on the RS125 loom

- Use a connector on the Black sensor wire to connect to the White CDi cable (8) - sensor input
- Program the maps to:
  - All gear settings ignition cut mode = down
  - Gear settings ignition cut revolutions =10
  - Gear settings ignition cut force = 50%
- Leave a map (ie Map A) with the ignition cut mode set to off

WARNING

Do not connect coil drive (High Voltage) to the CDi sensor input lead this could result in damage to the CDi unit

Wiring a Shifter by the normal method of splitting the coil drive wire is not recommended. The higher voltage drive at

low RPM can lock-up other manufacturers control boxes.

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Water Pump Controller:

2 core cable, red / orange, cable identifier=(10)

The two wires can connect to a 12V water pump. Max drive current = 2A

- red = +12v
- orange = switched gnd
- Software settings alter the pump mode, continuous, head sensor or radiator flush

On starting the engine there is a 10 second delay before starting the pump to allow the alternator to provide sufficient current.

In continuous mode the water pump is powered permanently.

In head sensor mode the water pump output is only powered when the sensed temperature is over the programmed level,
this will not operate with the sensor in the normal radiator positon, an in-head temperature sensor connected speeds the response.
As an alternative, the head sensor mode can also be used to power a bypass valve; permanently power the pump and use a two way
valve to bypass the radiator, ensure the sensor is upstream of the valve.

In radiator flush mode the pump is operated at a pulsed reduced rate below the threshold temperature and permanently run above
the temperature. With this mode some temperature stability is gained around the temperature

point if the normal amount of radiator tape
is reduced.

CAUTION slower pumping increases the temperature difference between the inflow and outflow of the head / barrel.

- Flush A = 1/4 second on, 3/4 second off
- Flush B = 1/2 second on, 1/2 second off
- Flush C = 3/4 second on, 1/4 second off

A suitable water pump is available from BPS - recommended setting: 51DegC, Rad-Flush B

On temperature sensor 0 DegC or open circuit - pump runs continuously.

WARNING
The water pump cannot be operated from the RS125 alternator only, Battery operation is recommended 14.4V 3.6Ah

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Exhaust Temperature input connection RS125 GP CDi only:

4 core black cable, circular connector

The 2 wires can connect directly to a solenoid valve.
the internal wires are:

- green = Gnd
- yellow = exhaust temp 1
- blue = exhaust temp 22
- red = +12v supply

Connect to the BPS exhaust temperture module

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Handle bar switch:

5 core cable, grey / black / yellow / green / red, cable identifier = (9)

Typically the handle bar switch is fitted to the left-hand handle bar, check for sufficient extension between the grip and clutch, remove any excess bar after the fork mounting as this will impair the view of the screen.

The kill switch is usually moved to the right-hand handle bar.

The connector directly connects to the switch unit supplied. If the switch is not connected then the Dash unit will select map B as the active map in use.

When changing the map selection whilst the engine is not running the display update will be slow.


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User Communication lead PSU / Charger

The PSU / Charger which plugs into the communication lead is currently not supplied to customers outside of the UK.

The CDI can be powered for programming by either:

- The communication lead rechargeable internal battery
- 12V-18V Battery connected onto the motorcycle loom
- Connecting a suitable PSU to the communication lead

If more than one power source is provided then the BPS RS125 CDi will be powered from whichever is the highest voltage.

Communication lead internal battery:
The communication lead internal battery is of low capacity and is intended for use where no mains power is available or a quick check of display values is required

- The battery will power the CDi for programming for approx. 30 minutes
- A minimum of 7V is required to program the CDi
- The battery is recharged when connected to the charger - from empty 10 - 14 hours charge is required
- To check the battery voltage press the yellow button and read the display.
- If replacement is required the battery is a 9V PP3 Metal hydride rechargable

PSU / Charger:
The PSU / Charger will power the CDi for programming and recharge the communication lead internal battery.

WARNING:
DO NOT ATTEMPT TO POWER THE MOTORCYCLE WHEN RUNNING SOLELY FROM THIS LEAD,
TO DO SO WILL BYPASS PROTECTION CIRCUITRY AND DAMAGE THE CDI.
The lead can be left in place if the CDi is being powered from the alternator, main battery or from some other source.

Specification

- Voltage 12V-18V DC (or 9V-16V AC)
- Current 500mA
- Connector 2 .1mm power plug connector, centre positive

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BPS RS125 CDi Battery / Alternator Supply Notes:

Power supply Specification:

- Maximum operating voltage = 20V (absolute maximum voltage 28V)
- Minimum fully operational voltage for the CDi = 10V (power-jet / tacometer minimum = 11V)
- Minimum operational voltage (reduced spark voltage on some maps) = 8V
- Minimum programming voltage 7V
- Typical CDi current consumption at 1,000RPM - 15,000 RPM on default spark voltage = 1A
- Maximum CDi current consumption not including power-jet or other solenoids (high spark voltage) = 2A
- Estimated minimum battery capacity for 1 hour operation with default spark voltage, power-jet operation etc. = 2.4Ah 14V

Battery fitting notes:

- Wire the battery into the regulator connector: green = gnd, red = +ve
- Do not wire into any other wires - you may bypass the kill switch.
- Remove the regulator unit - this will only drain current.
- Have at least one spare battery pack, one on charge one in use
- Use Nicad (cheap), Lead Acid gel (heavy & cheap - voltage too low) or Metal hydride(high capacity)
- Nicad batteries require a full discharge to maintain their full capacity
- Check battery voltage before use (press the yellow button and read off the voltage)
- Use a higher voltage battery pack, to use a nicad / metal hydride to its full capacity then we require operation at 0.8V a cell, use 12 cells for a 14.4V battery pack - longer operation for the (Ah) capacity

- Some Lead acid gel batteries suffer with vibration problems - check with manufacturer.
- Keep all battery leads a short as possible, use wire of 16/0.2 standard or thicker
- Optimal battery mounting position is behind the tacometer - assists in weight distibution on RS125

Programming with a battery power CDi notes:

- As electical power is available at low RPM it is possible to lower the power-jet start rpm (normally 4000 rpm) to below 1000 rpm this will stop the over-rich at low rpm (plug oiling etc).

WARNING:
DO NOT CONNECT A BATTERY TO ANY CDI SENSOR POWER LEADS OR THE USER COMMUNICATION CONNECTOR

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Checking throttle sensor position

The throttle sensor determines the position of the power-jet acceleration and deceleration cut-off point.
It is normally factory set to be rotated on by approximately 10% when the throttle is in the off position, this needs to be checked and adjusted if necessary.

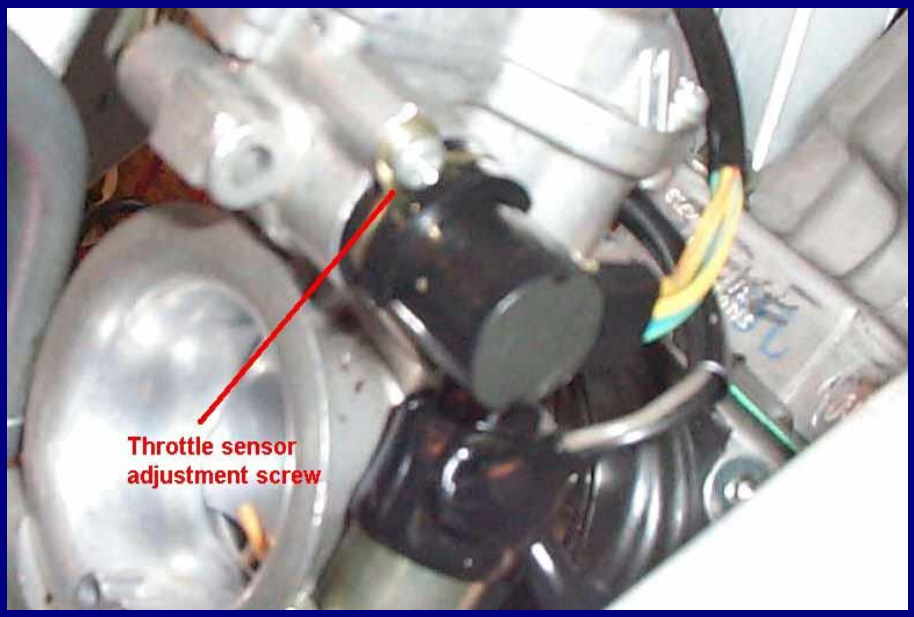
If the sensor gives a gearing below 7% or above 90% rotation then the pot is classed as failed by the ignition and the power-jet is forced rich.

To check:

- Power up the motorcycle by battery or communication lead
- Press the yellow button on the handlebar switch, read off the 2 digit number on the bottom line to the left of the '] ' symbol
- The response to the throttle action will be slow (as the engine is not running)
- With the throttle off the number should read 10 - indicating a 10% rotation
- On full throttle the sensor should read approximately 70% to 80% rotation

To adjust:

- Loosen the retaining screw
- Throttle fully off
- Twist the sensor body clockwise to increase a low value / anticlockwise to reduce a high value to obtain the value of 10
- Tighten the retaining screw
- Re-check the value



The same method can be used to view the power jet throttle positions, on battery power, move the slider up and down and view the rotation percentage from the display.

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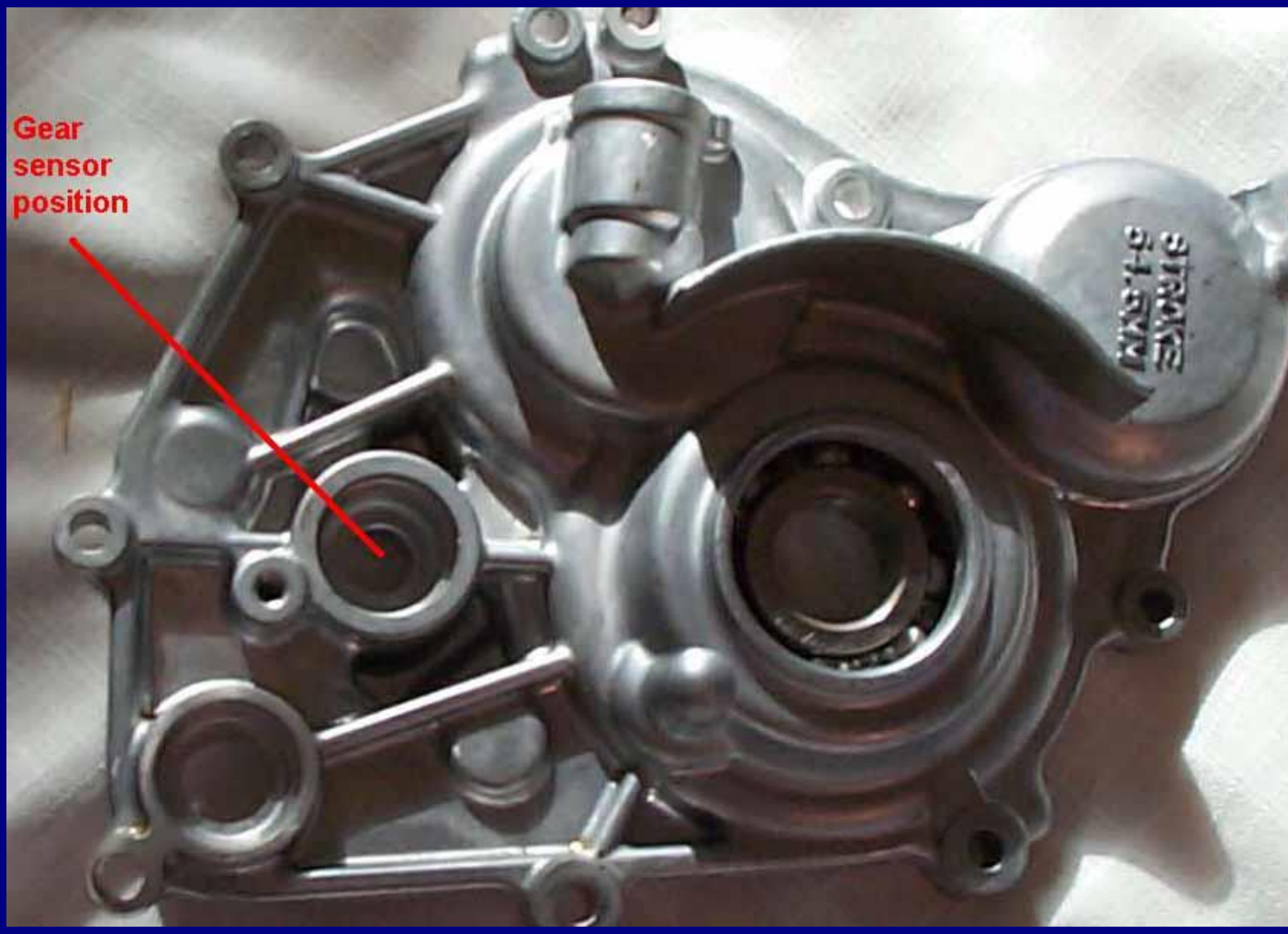
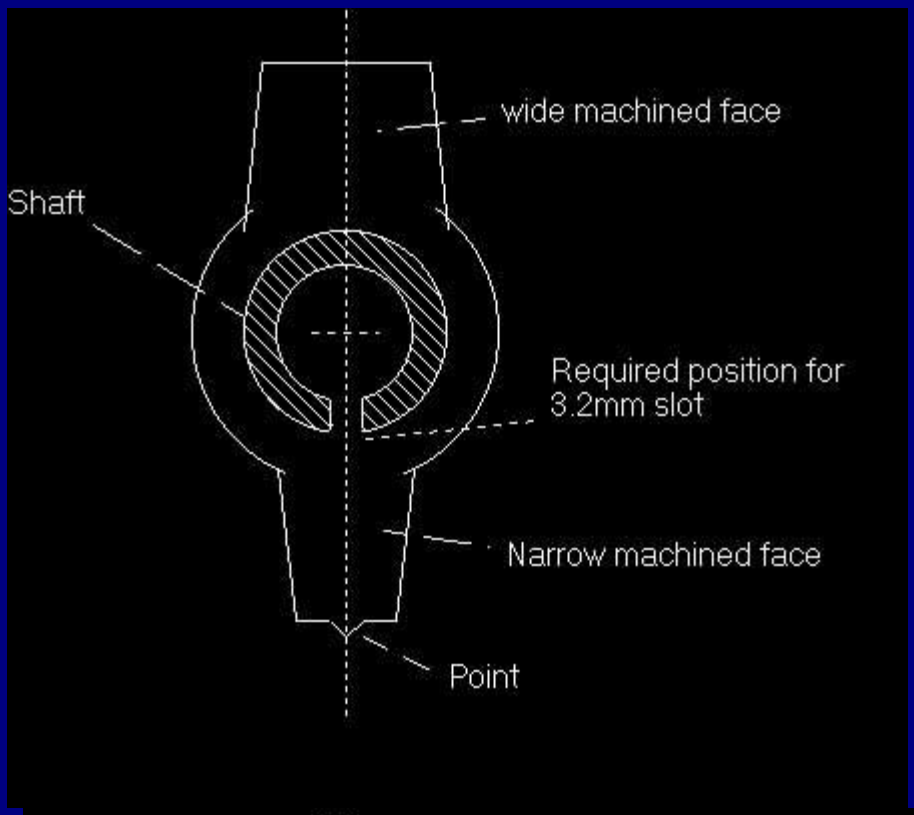
Gear sensor - Selector drum and left hand transmission cover machining.

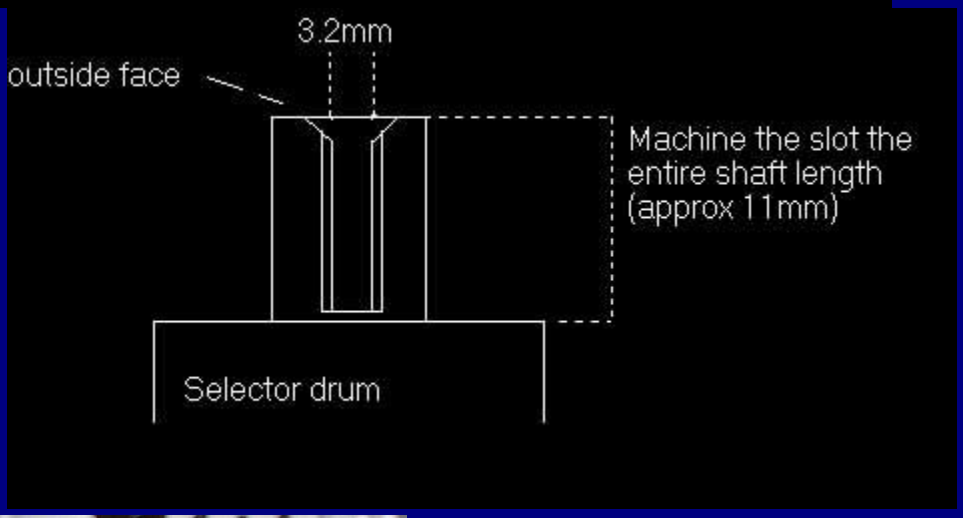


The Gear position sensor uses the rotational position of the Gear selector to sense the gear. The Sensor fitting requires machining of both the left hand side transmission cover and the selector drum. This can be performed with the following instructions and a milling machine or alternatively performed by BPS.

<u>The Selector drum shaft</u>

Machine a slot 3.2mm wide the length of the shaft. Position the slot in line with the point in the casting. Chamfer the outside edge of the slot by 1mm.





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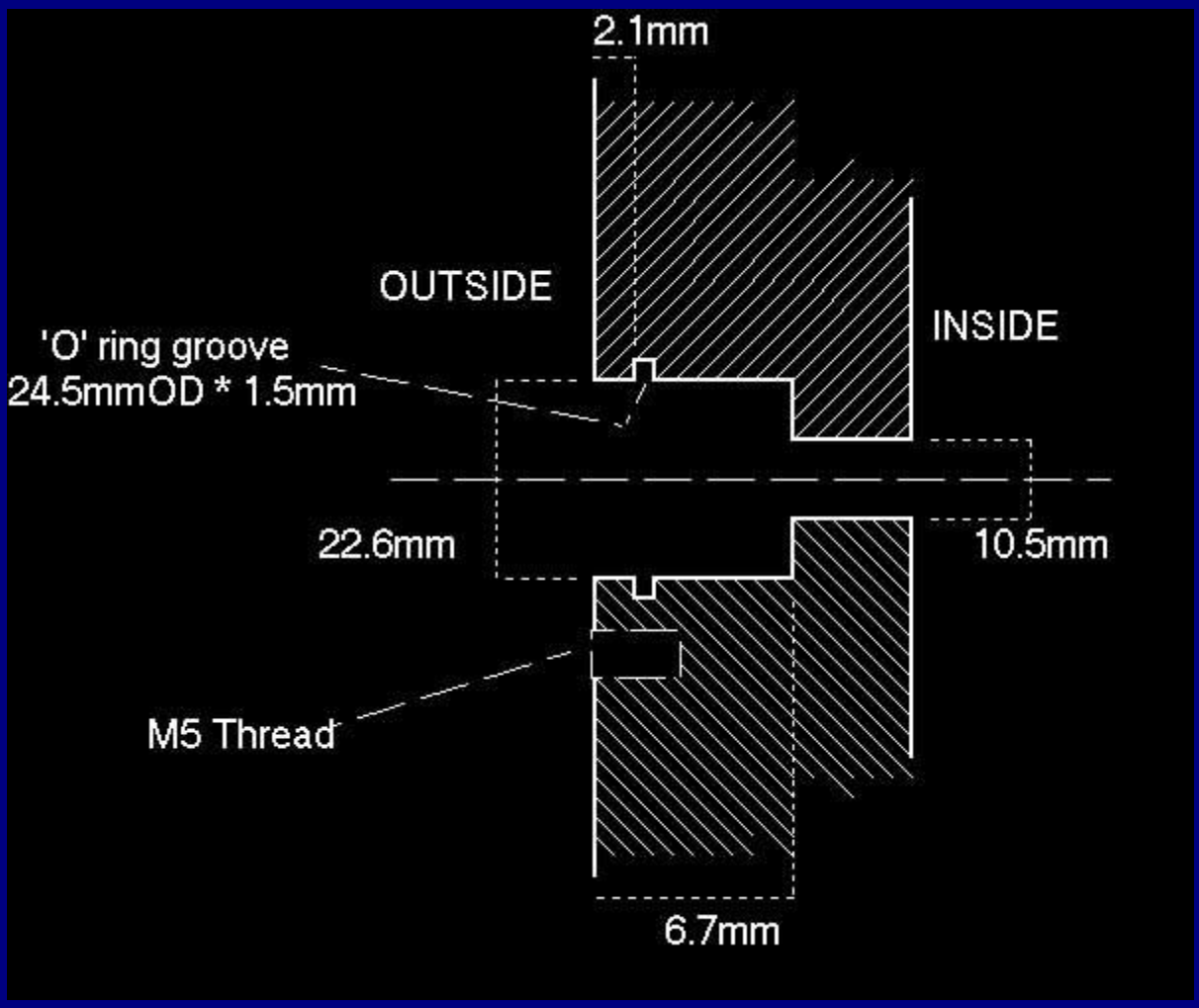
Left Hand Transmission Cover

In the position of the selector drum shaft a 10.5mm hole through is to be machined, followed by a 22.6mm hole 6.7mm deep. The sensor is sealed by an O-ring fitted into a groove 2.1mm in from the outside face. The O-ring is supplied with the sensor



Fitting the Gear position sensor to the Left hand transmission cover

Locate the O-ring seal supplied in the groove in the cover, apply a thin film of grease. Push the sensor into the machined hole locating the positioning tag with the tapped hole in the cover. Bolt in using the M5 bolt supplied. Check that the sensor is sitting flush. On the inside of the cover check the sensor is central in the hole.

Fitting the gearbox side plate with gearbox sensor

It is usual practice to leave the sensor attached to the Left hand transmission cover. Offer the cover plate up to the gear box with the locating peg in line with the selector shaft slot.

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CDI Dashboard Display and Rider controls

Rider Controls:

The handlebar switch provides:

- 4 position map selection switch - A / B / C / D
- Information push switch - Yellow
- Maximums / reset maximums push switch - Grey

Pressing the Information switch displays screen 2.
Pressing and holding the Information switch and then pressing the maximums switch shows the maximums screen.
Pressing just the maximums switch will prompt with .. Reset values? Pressing the maximums switch again will reset the maximums.

Display screens:

The main display screen shows:

- Temperature
- Detonations
- Last lap time
- Gear and current mapset

Screen example A: Temperature 51 DegC, 0 detonations, No laps, Map B, 6th gear.
Screen example B: As example A except; now on Lap 2, last lap completed in 49.6 seconds.

The second screen shows:

- Supply voltage
- RPM
- Ignition spark voltage / Brake input status / Lap sensor status / Power-jet status / Catch driver status / Throttle position percentage
- Speed (kph)

The maximums screen shows:

- Maximum temperature in (4 / 5 / 6th)
- Maximum RPM (in 6th)
- Fastest lap and fastest lap time
- Maximum speed

Screen Example C: Second screen
Voltage 14.8V, 6400 RPM, 54 Kph
Ignition spark voltage level 3, spare output = 0,
brake input (B)=off, lap sensor (G)=no detecting, power-jet(P)=on, catch tank (A)=on

Screen Example D: Maximums screen
Maximum temperature in 4th / 5th / 6th = 51DegC, Maximum RPM in 6th = 13,600
Fastest lap= lap 1, fastest lap time = 59.3 seconds , fastest speed = 193 Kph

Screen example E First press of grey button
Screen example F Second press of grey button

Other Screen Messages

BPS RS125 CDi Title screen - present after power up.

Current Map name - Appears afer changing maps or after the title screen, this is defined by the map author.

Warning messages:

- LowVoltage (<8V)
- High Voltage (> 20V)
- Low temperature (< 30DegC, > 12000 RPM)
- High temperature (> 80 DegC)

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BPS RS125 CDi - PC Software

Installing

See - Installing the PC Software
Serial Communication

See:

- Starting the Software Program
- Programming System Configuration
- Programming the CDi with mapsets
- Sending a map or mapsets to the CDi
- Uploading and displaying the log data
- Altering map profiles
- CDi driver and inputs Tests
- Printing map data

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Installing the PC software

The software is suitable for: Windows 95/98/NT
Requiring 10M Free hard drive space

- Close any other applications
- Insert disk 1 into the 'A' disk drive
- From the Start menu Select 'Run'
- In the run command box type a : setup
- When instructed to do so swap disks;
    - 2nd disk, you are prompted to insert disk 2 or 52 - insert disk 2
    - 3rd disk, you are prompted to insert disk 3 or 53 - insert disk 3
    - etc..
- The set up program may update files on older versions of windows :

  Typically files requiring updates are ... *.ocx files or *.dll files
  This may cause the system to request a restart. If this is required then:

    - Remove the disk from the drive.
    - Restart windows.
    - Replace disk 1 and repeat 'Select run etc. ...
    - The set-up program will continue from where it left off.
- The system will ask to close any other applications - select continue
- The system will prompt with a default install directory - click on the large button with a picture of a computer.
- The system will prompt with default program groups - click continue
- The system will transfer files and prompt with a " completed successfully prompt "

The install is complete.

Notes :
If the screen size is incorrect:

- From Start menu; Settings - Control panel - Display - Settings
- Screen area 800-600 pixels or larger (i.e. 1024 by 768 , 1280-1024 etc.) 640 by 480 is too small

Screen colour - use high colour (16 bit) if possible
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Serial Communication

The PC communicates to the CDi via a Standard PC communication port (serial port).

This port is a 9 pin male (D-type) connector usually found on the rear of most PC computers and laptops. If this is currenty used for the mouse or other pupose then a different communication port can be selected from the CDi sofware.

On loading the PC program the system will search for an unused comm-port. Each in-use comm-port the PC program will mark with a 'X'on the comm-port menu.
The first located free comm-port will be marked with a tick on the menu.

To choose a different comm-port:
From the 'comm port' menu choose a new comm-port 1..4, some PCs do not support comm-ports 3 and 4 and so selecting these will cause a ' not available message ' . Some PCs use a 25 way connector for the comm port, If this is the case then purchase a 25 to 9 way male adaptor

If required the cable from the PC to the BPS comms lead can be extended by purchasing a 9-way D-type male to 9way D-type Female extension lead (do not use a null modem lead)

The CDi unit can also be programmed remotely via modem if required - See BPS for details

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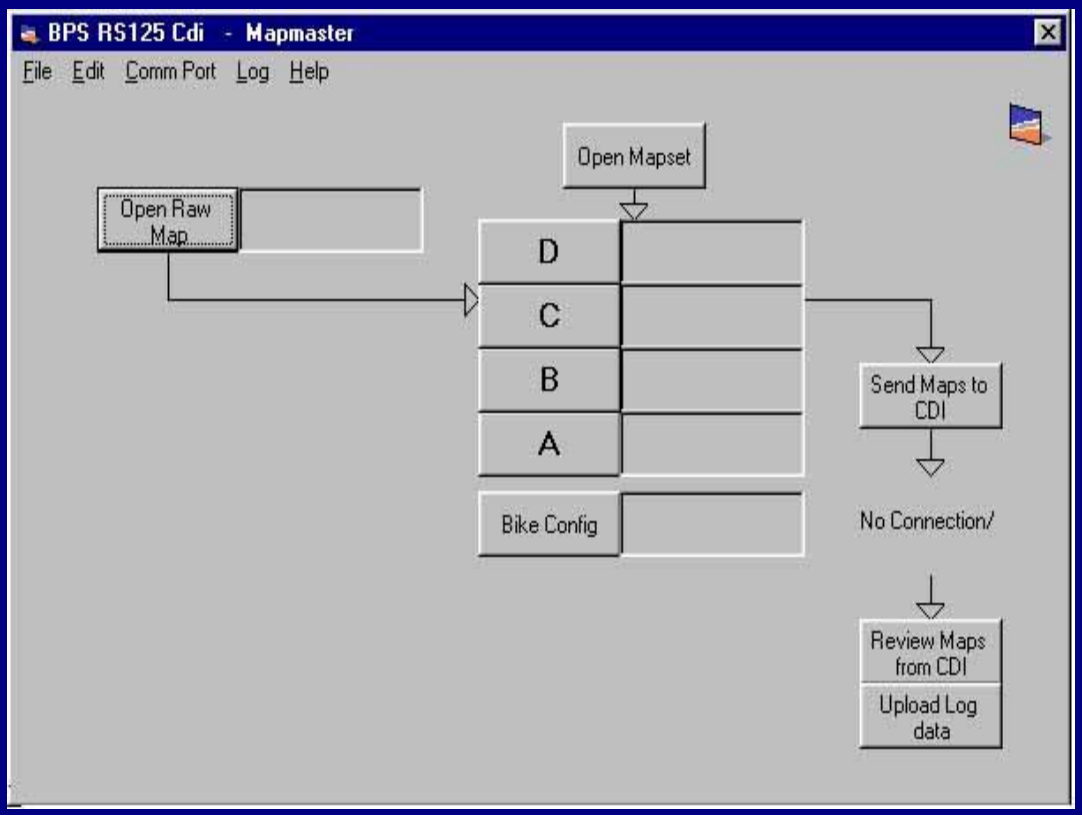
Starting the Software Program

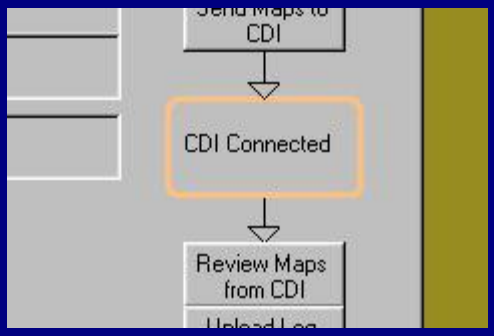
To start the program select Start - Programs - BPS RS125 CDi programmer - BPS RS125
(to create an icon of this in your background workspace see your windows manual)

The Main screen looks like this:



Connect the CDI to the computer using the User Communication lead. Connect the PSU / Charger to the power socket on the lead, connect the blue 9 way connector to the computer serial connector, and connect the cable to the motorcycle.

When the CDi is connected to the computer successfully then the ' No Connection ' will be replaced by 'Connected' and the Dashboard screen will go dim (to save battery power) and display ' user on line' or ' no data ' . If a 'comm port not available' or error message appears then see Serial Communication



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Programming System Configuration

System Configuration sets the sensor settings to allow a CDi to relate to an individual motorcycle. Once set, if the CDi is not moved from one motorcycle to another then the configuration can remain unchanged.

From the main screen click on 'bike configuration' to view / edit the configuration

Gear position sensor
The gear position sensor set-up must be performed for each engine. To allow the system to learn the gear positions click on 'learn gears' and follow the instructions. After completing the learn process the gear detection values will have changed. and the OK button will be orange. Save the configuration file under the name of the bike and finally click on OK to exit the configuration screen. The config button will now be orange. To load the CDi with the new data click on 'send maps to CDI' this will down load the new gear position values. - Once downloaded check the gear position values by exiting the program (to enable normal dashboard display) and cycle through the gears watching the display.
Note - the response is slow when the engine is not running

The default values are average for a BPS sensor:
14.8%, 20.7%, 27.7%, 35.5%, 42.1%, 48%

Use of other types of sensors
We recommend the use of the BPS sensor for future enhancements.

The system will learn any resistance sensor between 1K and 10K that has a sequence that increases or decreases through the gears.

The system will learn a Honda A-kit gear position sensor, the average values are:
64%, 46.4%, 33.2%, 23%, 14.4%, 7.4%

Note: Do not use a 500 twin sensor as this is segmented differentlty inside and does not provide the correct switching action

Tyre outer diameter
Altering this value and downloading this to the CDi will alter the scaling for the speed value.
The typical value of 1810mm is for a Dunlop front slick.
As the tyre wears down this will change the measured speed value.

Temperature sensor scaling
The standard temperature sensor is 47K at 25DegC. The scaling mathematics can be adjusted to calculate sensors between 33K and 100K in 1K steps.
Using a temperature calibration thermometer the fine adjustment of the value can be used to obtain greater accuracy if required.

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Programming the CDi with mapsets

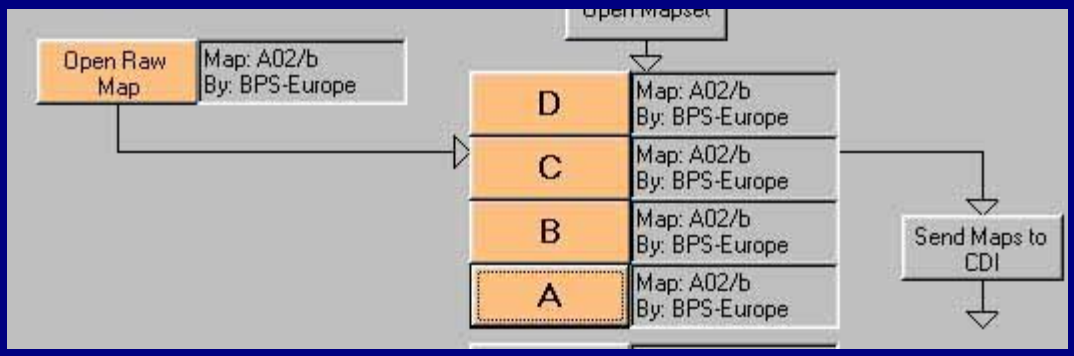
A raw map is an ignition timing map that has no gear position information or a location on the handlebar switch (it is not yet assigned to A,B,C or D)
To use a raw map we must define the differences per gear and assign it to a switch position.

First open a map from the computers hard / floppy disk - 2 maps are supplied with the software:

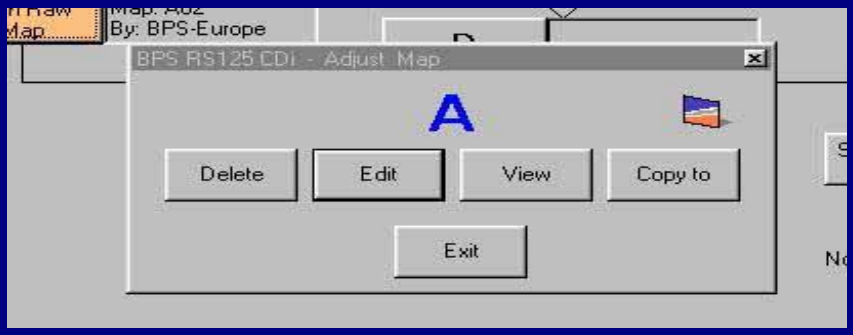
- Standard unleaded for the 97 bike - suitable for 97-99
- A-kit example for 98 bike

With the mouse tap on 'Open Raw map' - from the open file box choose a map to use - click on open. Once complete the 'Open Raw Map' button will be Orange and the operational name of that map displayed alongside.

With the mouse then click on one or more of the Switch position boxes A,B,C,D - this copies the map to these positions and turns them orange when they are active.
It is recommended that the A map is used as a safe map, high power-jet cut off points, low or no advance per gear. Maps B / C / D are then programmed to be each a more aggressive map. This allows the rider to progress up the switches to find a suitable setting. If detonation occurs then the rider can work back to a safer set of settings.



If a map button that is orange is clicked with the mouse the following message box appears:



- Delete - removes the map and reverts the switch button to grey
- Edit - allows alteration of the map per gear - The Changes per gear screen
- View - provides a table overview of the current map settings
- Copy - allows the other maps to be copied to this map
- Exit returns the user to the main screen with no changes

To adjust the map per gear click on edit:
Overall advance, Power jet, change gear indicator and gear cut settings are all adjustable per

gear. Clicking on all gear settings allows settings which are common to all the gears in that map.

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Sending a map or mapsets to the CDi

The CDi unit must have a suitable active map in each map position, as maps are not able to be deleted from the CDi and can only be overwritten, It is important to ensure that the maps are suitable for the current exhaust / barrel set-up.

When four maps are complete and ready to send to the CDi (a full mapset). With the CDi connected click on 'Send maps to CDI' the system will prompt with 'save mapset'. Saving this mapset is advisable as it will allow it to be recovered in full at a later date. The system will then download the maps

If only one of the maps is active (orange) then only one map will be sent.

To check the information that has been sent then press 'Review maps from CDI' this will allow a review of the data in the CDI - THIS DOES NOT UPLOAD THE MAPS AND DOES NOT OVERWRITE THE MAPS IN THE A / B / C / D POSITIONS ON THE PC.

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Uploading and displaying the log data

New log data

With the CDi connected press the 'Upload log data' Button this will extract the saved data from the CDi
The user will enter the log area select screen. The log data can then be saved to a file, or saved files can be loaded back.

Existing log data

Select log from the menu bar and then log analysis. Choose an existing log file and press 'open'

Log Graph

Pressing the 'Graph' button will display the log graph
The log graph is displayed back in time, from the last point the ignition was operative and speed over 10Kph was detected
Placing the mouse cursor over a graph point will provide the data in the data box area for that point in time.

RS125 GP CDi system only:
Exhaust temperature and cyclinder pressure graphs can be enabled / disabled by clicking the relevant name in the data box area

Log area select screen
Selecting a log area will allow further analysis of that area, select all or one or more of the periods displayed

Exhaust temperature analysis - RS125 GP only
Temperature change over RPM for all or individual gears

Cylinder Pressure - RS125 GP only
Pressure change over RPM for all or individual gears

Gear analysis
The table of values are provided for full throttle only, providing information on rider gear change / gearing / gear use

Det analysis
The graphs provide information on detonation with respect to:

- Throttle positon to adjust carburation
- RPM to adjust ignition advance
- Gear to adjust advance / carburation per gear

Lap analysis
The table provides information on the laps detected and the fastest lap

Sys analysis
The table provides information on the min / max / average temperature and supply voltage. Temperature and voltage are available with respect to time from the log graph.

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Altering map profiles

Map shape can be changed to allow advance / retard for every 72 rpm with 0.25degree steps

WARNING

- Changing the map shape could damage your engine
- Always use a Dynometer to measure results
- Always check and use a detonation ring
- Make small changes
- Do not advance the ignition too far

NOTE
BPS are not responsible for any damage caused by map adjustment.

Types of maps
A raw map is a map with no gear information or switch position, it is a single curve with a

name and a set of starting values that can be altered later (pow-jet rpm etc). If the raw map is copied into a switch position then duplicate maps are generated for each gear to that switch position.
Neutral and 1st gear use the same 1st gear map. It is possible for the CDi (but not allowed in this PC program - contact BPS for further information) to have a different map shape per gear.
Once duplicated the original of the map is retained as the reference map shown in map review screen.

Designing a map shape
load a raw map to adjust, select edit raw map from file menu, type in the password (supplied by BPS)

The map shape view can be zoomed in, out, moved right and left etc, to adjust an area right click on a map point with the mouse, right click on a second map point, this will highlight that area selected. The highlighted line can then be advanced '+' or rertarded '-' or straighted out 'straight'.

The dotted lines are the limits to the map shape, any advance or retard that is too rapid will cause a warning.

When happy with the new shape click on 'OK' to transfer to the defaults screen. This allows the setting of the values that appear when the map is adjusted in the main part of the program. Change the name/author of the map to distinguish between maps when used

Use abbreviations in maps names such as:

- unl = unleaded
- avg = avgas
- std = standard exhaust
- exp = experimental
- lc = low compression
- hc = high compression
- lr = low rpm power band
- hr = high rpm power band

Use map names such as 'std_unl/001'

Note the map name is not automatically the same as the file name that the map is stored on the PC, although keeping these two the same is advantageous.

After completing any changes required to the defaults screen then click on 'OK' the map can be saved at the prompt. the new map is now loaded into the raw map and can be used as normal.

<u>Different maps per gear - RS125 GP CDI only</u>

Load a raw map or mapset as normal into a switch position so that the relevant A-D button is orange

Load the start-line (or low gear) raw map into the raw map position.
Click on the A-D button and edit the mapset settings, the individual gears are all named and have an numbered orange button,
pressing the relevant gear button for the new start line map then select delete from the menu.
Click again on the now grey gear button to copy the raw map into this position.

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CDi driver and inputs Tests

The test screen is available from the File menu
The test screen allows the user to test the CDi inputs and output drivers and the driven solenoids/devices.

Driver test
On/Off controls switch the drivers on or off. If the driven device is a solenoid then the CDi powered from the communication cable may not have sufficient power to operate that device. Care must be taken on the duration of the test as some devices are not designed to run continuously or run without air cooling (check with manufacturer)

Tacometer test
Runs the tacometer at 13000 RPM for a short period (not available on versions before CdipV1_23)

Analogue inputs
reads the input values

throttle	range = 0-99%
gear sensor	range = 0-99%
temperature	range =0-48% (requires the config map to calculate the temperature)
voltage	range = 20-100% (equivalent voltage shown)
gear change pressure	range = 0-99%
exhaust temperature	range = 0-99% (not currently active)

To test a sensor, adjust to min and max positions (short circuit to gnd / open circuit) and review the values

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Printing map data

To select the Printer and or number of pages etc. Printer set-up is available from the file menu.

To print out mapset settings select print from the review screen, this will print out:
map A / B / C / D details review, raw map details review, config settings.

To print a map shape from edit raw map graph screen press print.

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Additional ideas

Map control
The handle bar switch can be replaced by:

- A fixed plug - disallowing the rider to change the settings.
- An additional sensor, allowing some other input (air pressure, wheel slip, radio link etc) to alter between the four maps used

Lap timer
The lap timer input could be connected to a simple rider press switch, for an economy lap sensor

Rider Emergency plan

Plan for failures
Structure the system to allow your rider to finish the race, brief your rider on an emergency plan if something fails
Some ideas:

- Use map A as a safe-map
- Select the safe-map to have no gear change cut action
- If the gear position sensor fails then plan the safe-map to have all gears similarly safe
- If the throttle sensor fails or motorcycle is running a very weak fuel mix - un plug either the orange throttle connector or the grey power-jet to force to a rich mix

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Windows Version Read-me

How To Update to the latest version

. Close any other applications
. In Windows explorer or My Computer select : drive C: Program Files BPS-RS125CDI

find BPS125CDI.exe and delete this program
find(if present) BPSRS125.htm and delete this program

Load the new software as described above

Loading from Email

From Email the software is sent as five packets each relating to a 3.5" disk of information, allowing the program to be stored / distributed on disk easily.

Disk contents:

disk 1 setup.exe
setup.lst
BPS1251.cab

disk2 BPS1252.cab

disk3 BPS1253.cab

disk4 BPS1254.cab

disk5 BPS1255.cab
readme.txt (this text document)
Oleaut32.dll (windows support for early win95)

Install notes:
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1. Unable to reload BPS RS125 software

If BPS RS125 CDi set-up has been launched and stopped then the file st6unst.log provides the information on the currently loaded files. Deleting this
file will allow setup.exe to reload all the software fully.

2. Unable to Run Setup.exe on First Windows 95 Version

BPS RS125 CDi set-up will not launch on certain installations of Windows 95 due to lack of support for an API in the original version of the Oleaut32.dll. This
failure will not occur on OS release 2 of Windows 95 or any versions of Windows NT 4.0 and later, and will not occur if Microsoft Office 97 or Internet Explorer
3.0 or 4.0 has been installed. You can also work around this failure by first overwriting the older version of Oleaut32.dll with the latest version.
Be sure to shut down all applications before attempting to manually update Oleaut32.dll

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About

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BPS RS125 CDi

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